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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,477	03/05/2004	Roy A. Mangano	GEMS8081.202	2476

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EXAMINER	
BANKHEAD, GENE LOUIS	

ART UNIT	PAPER NUMBER
3744	

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/708,477	MANGANO ET AL.	
	Examiner	Art Unit	
	Gene L. Bankhead	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-5,7,9-11,15-18,26,28,31 and 32* is/are rejected.

7)☐ Claim(s) *6,8,12-14,19-25,27,29 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/09/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Minor Informalities

Claims 1-9 are objected to because of the following informalities:

The recitation of "MR" should be --Magnetic Resonance (MR)--.

Appropriate correction required.

It is believed the recitation of "power deliver circuit" in claim 8, line 4 is meant to be --power delivery circuit--.

Appropriate correction required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5,7,9, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emeric et al. (US 2002/0148604) in view of Gamble et al. (US 5848532) in further view of Lee (US 6626004).

Regarding claims 1,7 and 9, Emeric et al. teach a cooling system for an Magnetic Resonance device comprising; a MR system having a superconducting magnet in a sealed vessel and a heat exchanger configured to cool the superconducting magnet (paragraphs [0012-0017]). They do not explicitly teach the recondensing system has a heating element configured to melt iced particles from it. Gamble et al. teach a cooling

system for a superconducting magnet with a heating element 25 configured next to the recondenser 12 capable of melting iced particles on the heat exchangers surface. Though they do not explicitly teach the heater provides sufficient heat to melt iced particles, heaters able to melt iced particles from iced surfaces are well known in the art. Further, Lee teaches a defroster heater 34, with a power circuit 44, which melts frost from an evaporator 30 (column 5 lines 7-15). Note, Lee teaches the power circuit is set to the appropriate pitch according to the amount of frost present on the evaporator and the amount of heat needed to melt it (column 3 lines 53-67 and column 4 lines 1-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling system of Gamble et al. with the heating element of Lee to advantageously melt iced particles from the surface of the recondenser and ensure excessive buildup of ice on the recondenser does not occur. It was well known in the art at the time of the invention excessive ice buildup on the surface of a recondenser severely reduces its efficiency and can lead to malfunction.

Regarding claims 2 and 3, Emeric et al. further teach a vacuum supply 74 configured to remove melted particles from the heat exchanger. They further teach the vacuum supply is configured to remove sublimated particles through an auxiliary cooling loop, see Figure 2.

Regarding claims 4 and 5, Emeric et al. teach all limitations of claim 2, and further teach pressure sensors connected to the vacuum chamber (page 2 column 13). They fail to explicitly teach a vacuum supply valve connected to a heat exchanger of the system and configured to control the vacuum supply. Gamble et al. teach a cooling

system with a vacuum supply valve 36, configured to be capable of controlling the vacuum supply 16. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Emeric et al. with the vacuum supply valve of Gamble et al. to advantageously enable the vacuum to be turned on when the iced particles need to be removed from the surface of the recondenser, and turned off when all the particles have been removed.

With regard to claim 17, Emeric et al. teach an MRI system with a plurality of gradient coils 50 positioned about a bore of a superconducting magnet 54 (page 2 0025). They further teach a RF transceiver 58, RF switch controlled by a pulse module capable of transmitting RF signals to a MRI assembly (page 2 0016). They further teach a cooling system 70 arranged around the superconducting magnet, and a sealed chamber 10. They fail to teach recondenser to evaporate condensed evaporated coolant and at least one heating element to de-ice the recondenser. Gamble et al. teach a cooling system for a superconducting magnet capable of being used with MR systems (column 2 lines 14-22). They further teach a recondenser 12 (column 2 lines 38-42) configured to cool the superconducting magnet 14 (column 1 lines 55-67). Gamble et al. further teach a heating element configured to deliver a supply of heat to the recondenser. Though Gamble et al. do not explicitly teach the heater provides sufficient heat to melt iced particles, heaters able to melt iced particles from iced surfaces are well known in the art. Further, Lee teaches a defroster heater 34, with a power circuit 44, which melts frost from an evaporator 30 (column 5 lines 7-15). Note, Lee teaches the power circuit is set to the appropriate pitch according to the amount of frost present on

the evaporator and the amount of heat needed to melt it (column 3 lines 53-67 and column 4 lines 1-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the MRI system of Emeric et al. with the cooling system of Gamble et al. and the heating element of Lee to advantageously melt iced particles from the surface of the recondenser and ensure an excessive buildup of ice on the recondenser does not occur. It is well known in the art excessive ice buildup on the surface of a recondenser severely reduces its efficiency and can lead to malfunction.

Claims 10,11,15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamble et al. (US 5848532) in view of Lee (US 6626004) in further view of Chen (US 5782095).

In regard to claims 10 and 15 Gamble et al. teach a cooling system for a superconducting magnet capable of being used with MR systems (column 2 lines 14-22). They further teach a heater 25 (column 2 lines 38-42) configured to deliver a supply of heat to a recondenser 12. Though they do not explicitly teach the heater provides sufficient heat to melt iced particles, heaters able to melt iced particles from iced surface areas are well known in the art. Furthermore, Lee teaches a defroster heater 34, with a power circuit 44, which melts frost from an evaporator 30 (column 5 lines 7-15). Note, Lee teaches the power circuit is set to the appropriate pitch according to the amount of frost present on the evaporator and the amount of heat needed to melt it (column 3 lines 53-67 and column 4 lines 1-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling system of Gamble et al. with the heating element of Lee to advantageously melt iced particles from the surface of the

recondenser and ensure an excessive buildup of ice on the recondenser does not occur. It is well known in the art excessive ice buildup on the surface of a recondenser severely reduces its efficiency and can lead to malfunction. Gamble et al. in view of Lee fail to teach a supply tube and a delivery tube connected to the recondenser. Chen teaches a cryogen-recondensing magnet 16 wherein the superconducting magnet is immersed in a bath of liquid coolant 9 in a sealed vessel 12. Chen further teaches a supply tube 36 and delivery tube 41 connected to the recondenser and sealed vessel and configured to deliver gaseous coolant to the recondenser. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the superconducting magnet of Gamble et al. with the sealed vessel of Chen to advantageously ensure the superconducting magnet coils maintain operation after power is removed from the superconducting coils, and there is no further supply of electricity (column 1 lines 11-23).

Regarding claim 11, Gamble et al. teach the recondenser includes a plurality of heat exchanging fins (column 1 lines 43-47) and the location is such that it is capable of both cooling gaseous coolant and being cooled by the refrigerator 22.

In regard to claim 16, Gamble et al. (US 5848532) in view of Lee (US 6626004) in further view of Chen (US 5782095) teach all limitations of claim 10 as previously stated and further teach the supply tube is configured to receive a vacuum evacuation port so that the melted iced particles can be removed through the vacuum evacuation port. Note, Chen teaches the location of both the supply and delivery tube is directly across from the vacuum vessel. Their location is such that a vacuum evacuation port

could be used to connect the vacuum vessel to the supply tube or delivery tube, see Figure 1 below.

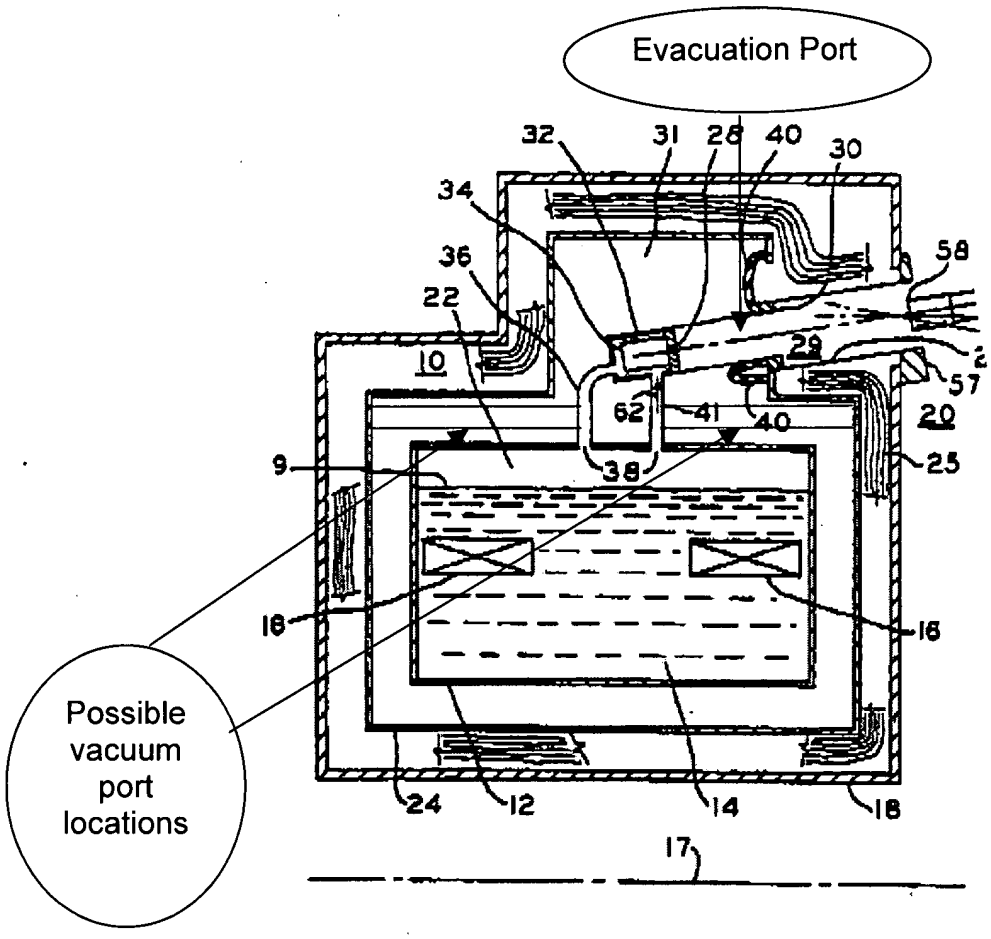

Figure 1 (US 5782095) Chen

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Emeric et al. (US 2002/0148604) in view of Gamble et al. (US 5838532) in view of Lee (US 6626004) in further view of Chen (US 5782095).

Emeric et al. in view of Gamble et al. in view of Lee fail to explicitly teach a superconducting magnet in a sealed vessel with a vent for venting vapor. Chen teaches

a cryogen-recondensing magnet 16 wherein the superconducting magnet is in a sealed vessel 12 forming a cooling jacket and configured to condense evaporated coolant. Chen further teaches an evacuation port 29 configured to be capable of removing vapor from the sealed chamber. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the sealed chamber of Emeric et al. in view of Gamble et al. and Lee with the sealed chamber of Chen to ensure there is not an excessive pressure buildup in the sealed chamber during or after the de-icing process.

Claims 26, 28, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamble et al. (US 5848532) in view of Lee (US 6626004).

Regarding claims 26, 28, 31 and 32 Gamble et al. in view of Lee in further view of Chen teach a cooling system capable of performing the method of claim 26. Gamble et al. teach vacuum insulated lines 16 used as a cooling loop. They fail to teach the vacuum supply is configured to remove the melted ice deposits. Lee teaches a defroster heater 34, with a power circuit 44, which melts frost from an evaporator 30 (column 5 lines 7-15). Note, Lee teaches the power circuit is set to the appropriate pitch according to the amount of frost present on the evaporator and the amount of heat needed to melt it (column 3 lines 53-67 and column 4 lines 1-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling system of Gamble et al. with the heating element of Lee to advantageously melt iced particles from the surface of the recondenser and ensure an excessive buildup of ice on the recondenser does not occur. It was well known in the art excessive ice buildup on the surface of a recondenser severely reduces its efficiency and can lead to

malfunction. Note, it is inherent that as ice melts, gas particles will be released will be released to the atmosphere.

Allowable Subject Matter

Claims 6, 8, and 12-14,19, 20-25, 27, 29, and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gene L. Bankhead whose telephone number is (571)-272-8963. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571)-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CHERYL TYLER
SUPERVISORY PATENT EXAMINER

Examiner
Art Unit 3744
Gene Bankhead